Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Peking, he has made his way quietly among people with whom the Russian explorer came into collision. Passing through Ladak, Mr. Carey proceeded to Northern Tibet, and thence to the plains of Turkestan, near Kiria. From Kuchar the Tarim was followed to Lake Lob. From thence the intention was to go over the Altyn-tagh, but nothing has since been heard from him.

MANCHURIA.—Since their journey to the Peishan Mountain and the sources of the Sangari, Messrs. James, Younghusband, and Fulford have visited some other parts of Manchuria. Colonists were perpetually arriving in Northern Manchuria, but brigandage is rife, and for the most part goes on unpunished, as the Manchu semi-military administration is most effete. The country is very fertile, and only needs good government and security to life and property.

•GEOLOGY AND PALÆONTOLOGY.

Notes on the Geology and Lithology of Lake Superior.—At the meeting of the Denison Scientific Association, Granville, Ohio, held April 23, a paper was presented by Messrs. Jones and Tight embodying the results of an excursion to Michipicoten Bay, undertaken by members of the class of lithology, conducted by the professor of geology in Denison University. In a more complete form this paper appears in the laboratory bulletin of the same college, volume ii., art. v., from which the following abstract and the accompanying plates are taken.

The field chosen contains good exposures of three of the great classes of Lake Superior rocks now under discussion. Especially good contacts between the schists regarded as Huronian and the granites variously classed as Laurentian or local-eruptive are afforded at many places along shore. Commenting on McFarlane's description of these contacts, Wadsworth says (" Azoic System," p. 346), " His observations show clearly that both formations here are eruptive and of the same geological age." The present paper shows that McFarlane overlooked the sharply-defined contact between the great dyke of " dense basaltic greenstone, having the peculiar dolerytic glitter" (a typical coarse diabase), and the series of (here hornblendic) schists which are at places greatly contorted by the influence of the granite and the diabases. The schists can everywhere be easily distinguished from the penetrating dykes, which lie in strike or dip. They are prevailingly chloritic, containing large quantities of calcite. At more or less regular intervals are beds of schist-conglomerate, which are regarded by the writers as true basement conglomerates. The pebbles are sometimes very large, and consist of granite and felsite-porphyry, often retaining the primitive jointing planes. The schists are here and there perforated by belts of felsite-porphyry, the feldspar being chiefly oligoclase. An interesting instance of the formation of a porphyry from the fusion of the schist-conglomerate by contact action of a diabase-aphanite or porphyrite is noted. In what may be assumed to be the centre of the fold are great beds of calcareous gneiss, often with sillimanite (?) needles. These are the only stratified granitic rocks seen, and form an integral part of the schist series. Dykes of diorite are very frequent in the schist, and in every case assimilate the adjacent schist to them very closely in general appearance, though the microscopic character may be quite markedly different. The method of occurrence suggests that the diorites are really but fused portions of the schists pressed up through the pasty yielding schist, which thus is greatly affected by the contact. The diabases, on the other hand, are of a much later origin, and perforate the granite as well as the schist. The felsite-porphyries are thought possibly to have been formed from the injection of matter from the granite below at the same time at which the diorites were formed and before some subsequent metamorphism, which involves the schist and all its intrusives except the diabases. A curious modification of some of the diorites is described, by which the long twins of actinolite have lost their pleochroism completely, although still preserving the normal angle of the optical to the crystallographic axis. The hornblende becomes exceedingly like augite in appearance and polarization. Much that has been called diorite-slate and diabase-schist, when carefully studied, can be analyzed into various intrusive diorites, closely assimilated to intervening beds of mica, and hornblendic-schist or a cherty quartz-schist so altered as to be scarcely identified. The Keweenaw series, which laps upon the eastern shore of Michipicoten Bay, is thought to occupy an original synclinal, though great erosion must have preceded the formation of the conglomerates which are the lowest members visible. On the island of Michipicoten these conglomerates are well exposed, and a careful study of their pebbles shows that they can all be referred to some one or other of the formations now visible along the north shore of the lake. The same granites, felsites, schists, and diorites can be identified. Chemical analysis does not detect copper in any part of the conglomerate studied, but everything seems to point to its origin from the amygdaloids, which everywhere cap the conglomerate and have in some places greatly metamorphosed the latter. Indeed, the writers of the paper incline to believe that some or all of the peculiar ferrugineous quartz-porphyry, forming the only acid eruptive seen upon the island, may be the result of such metamorphism of the conglomerate. Space does not permit a more extended reference to the interesting intrusives of the Keweenaw series, which deserve a careful and critical study. Microscopic sections of the rocks described are offered for exchange.—*H.*

DESCRIPTION OF PLATES.

PLATE XXII.

FIGS. 1–3. Modified chloritic schist at contact with a diorite to which it is assimilated. Figs. 1 and 3 are parallel to the lamination, Fig. 2 transverse. Fig. 1 shows decomposed crystals of orthoclase in a chloritic magma, with apatite and titanic iron. In Fig. 3 a large corroded crystal of calcite is shown as appearing between crossed nicols.

FIG. 4. A section of the large dyke of coarse diabase northeast from Michipicoten Island, at the western limit of the bay. The section shows only augite and labradorite in ordinary light.

FIG. 5. Pseudomorphs of chlorite after mica.

FIG. 6. A baveno twin of orthoclase from a granite.

FIG. 7. Diabase-aphanite toping the conglomerate on Michipicoten Island. A fine crystal of plagioclase is figured in a cryptocrystalline base.

FIG. 8. Twin of augite passing to uralite, from dyke of diabase at Dog River.

FIG. 9. View of the schist conglomerate at Dog River. Greatly reduced from a photograph.

FIG. 10. Hypothetical north and south section of the Lake Superior basin, partly after Irving.

PLATE XXIII.

FIG. 1. Section of quartz-porphyry from Michipicoten Island.

FIG. 2. Altered mica-schist from a boulder in the conglomerate.

FIGS. 3 and 4. Pseudamygdules from the diabases.

FIG. 5. Twin of augite from a granite on the north shore.

FIG. 6. Highly magnified portion of section of diabase-aphanite or porphyrite at Dog River, showing titanic iron in dendritic forms.

FIG. 7. Section of an altered diabase-porphyrite from Michipicoten Island, with concentric pseudamygdules of chlorite in stellate, polyhedral aggregates.

FIG. 8. Decaying crystal of plagioclase.

FIG. 9. Sketch map of region studied. Strike of the Keweenaw indicated by dotted lines.

Pavlow on the Ancestry of Ungulates.[1]—In this brochure the authoress recites the work done in Europe and North America towards the elucidation of the history of the origin and succession of the primitive Ungulata. Besides the literature of the subject, the University of Moscow possesses a series of casts of moulds made by Professor W. Kowalevsky from specimens of the Mammalia of the Puerco epoch in the collection of Professor Cope. The objects of the paper are stated as follows:

"1. I will present the successive modifications of the ideas of Professor Cope on the position of the group Condylarthra in the system.

"2. I will give a synopsis of the description of this group, such as has been given by Cope.

"3. I will analyze the opinions expressed by Messrs. Wortman and Schlosser as to this group.

"4. I will study the principles developed by the investigation of this group, in order to show that its different members are probably predecessors (ancestors ?) of certain orders of mammals; and,

"5. I will finally inquire whether the European fauna does

---

[1] Etudes sur l'Histoire Paléontologique des Ongulés en Amérique et en Europe. I. Groupe Primitive de l'Eocène inférieur. Par Marie Pavlow, Moscou, 1887.

PLATE XXII.

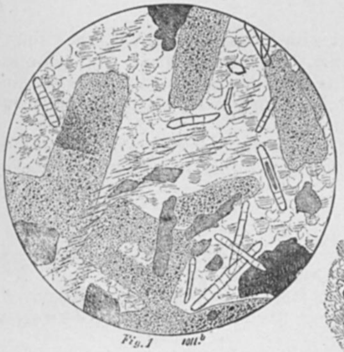


Fig. 1

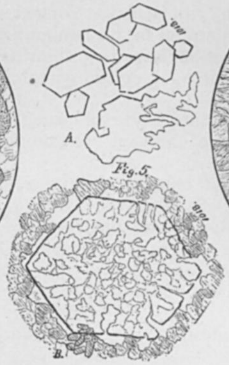


Fig. 5.

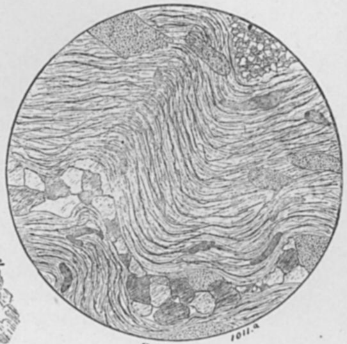


Fig. 2

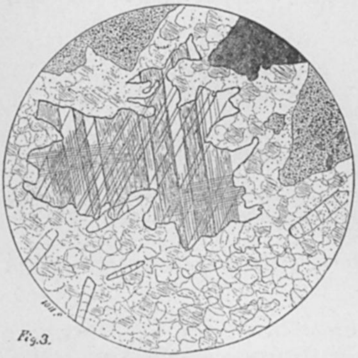


Fig. 3.

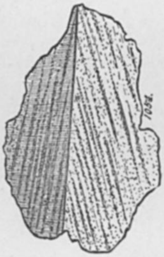


Fig. 6.

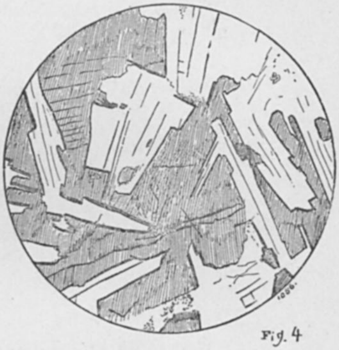


Fig. 4

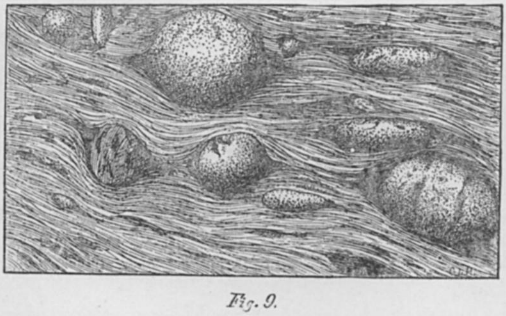


Fig. 9.

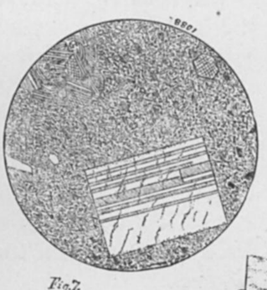
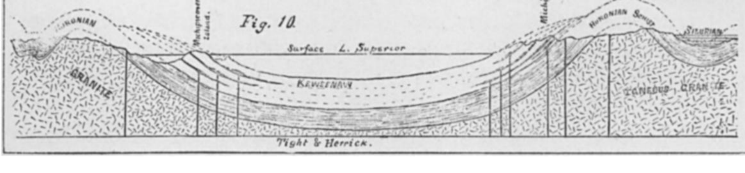


Fig. 7.

Fig. 10.



Tight & Herrick.

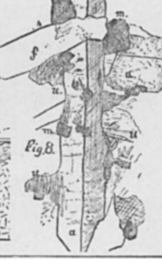


Fig. 8.

PLATE XXIII.

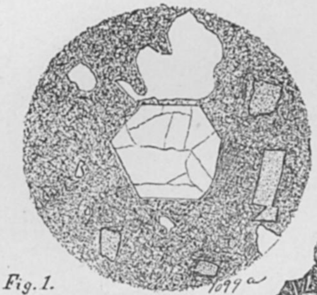


Fig. 1.

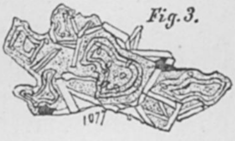


Fig. 3.

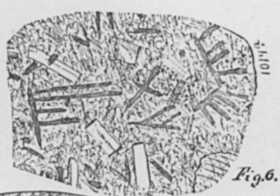


Fig. 6.

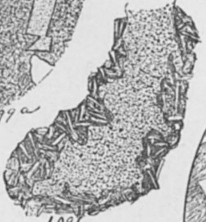


Fig. 4.

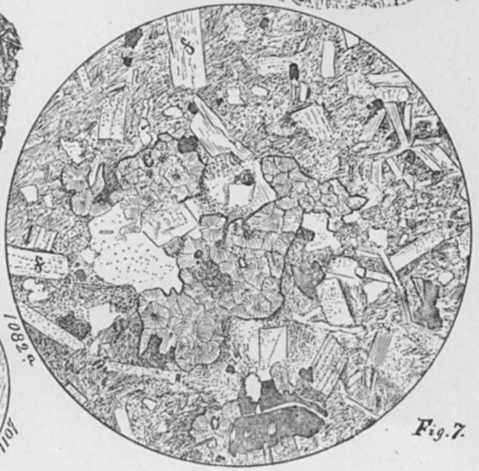


Fig. 7.

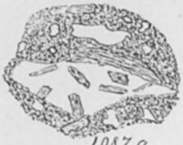


Fig. 2.

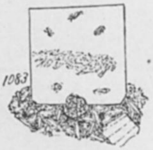


Fig. 8.

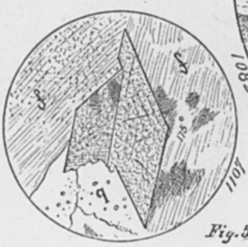


Fig. 5.

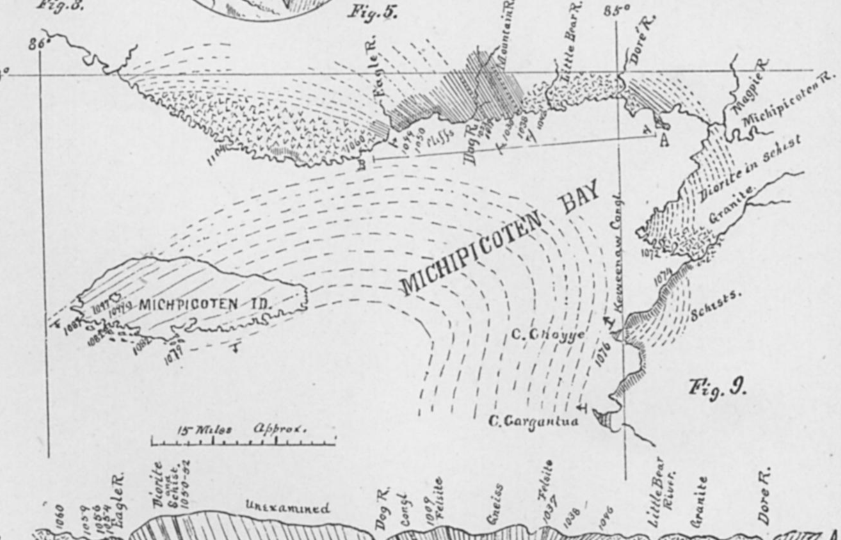


Fig. 9.

Jones & Herrick.

not present us with certain forms which should be placed with those which form the group Condylarthra."

These objects are realized with much fidelity, and the text is illustrated by a number of engravings, mostly from the casts made by Kowalevsky. The only exception to be noted in carrying out of Proposition 1 is the omission of reference to the opinion that the Condylarthra are ancestral to the lemuroids as well as to the other Ungulata.[1] The authoress gives a comprehensive review of the important paper of Dr. Schlosser (reviewed in these pages 1886, p. 719), discussing especially the genus Hyracotherium.

M. Pavlow concludes her review with the following propositions:

1. The Condylarthra is a mixed group, of which the forms present characters of Ungulata and Unguiculata, and that it should be regarded as occupying the base of the genetic tree of both ungulates and carnivores.
2. That *Phenacodus primævus* and *P. puercensis* are probably the ancestors of the Equidæ.
3. That *Phenacodus wortmani* should be excluded from this genus, and with Protogonia, which includes *Hyopsodus paulus* Leidy, should be placed among the Phenacodontidæ.
4. That Anisonchus, Haploconus, and Hemithlæus are rather the ancestors of the Carnivora; that their teeth separate them from other Condylarthra.
5. That Meniscotherium should belong to the group Propalæotheriidæ, and is perhaps synonymous with Propalæotherium.
6. That *Hyracotherium leporinum* should perhaps be regarded as the representative of the Phenacodontidæ in Europe, and that the other species of Hyracotherium should remain at the base of the genealogy of the Equidæ; and that, therefore,
7. The Condylarthra do not represent a group peculiar to America, but have representatives in Europe.

With regard to these conclusions, it may be said that the first and second are in accord with current views on the respective subjects. As regards No. 2, the difference between *Phenacodus wortmani* and the *P. primævus* is not so great as might be supposed from my figure of the superior molar teeth. The anterior intermediate tubercles of the superior molars are present, but, as they are somewhat worn in the specimen, the artist did not represent them nearly distinctly enough. Nothing but the teeth of Hyopsodus are yet known, so that its position is uncertain. It may be a lemuroid or an artiodactyle. (4) The genera mentioned have the dental characters of other Periptychidæ more or less modified, and, like them, are all constructed on a tritubercular principle. *Haploconus lineatus* is a miniature of *Periptychus rhabdodon.* The approximation of Periptychus to the Suidæ by Pavlow is made apparently in forgetfulness of this fundamental point. (5) Meniscotherium is a well-marked Condylarthron, and its characters show that foot-structures are of greater importance than those of the teeth. The latter resemble those of Pachynolophus (Propalæotherium), but the feet of the latter are unknown, and from its higher geological position it is likely to be a Perissodactyle, as it has been hitherto regarded. (6) M. Pavlow thinks that the *Hyracotherium leporinum* Owen (type of the genus) belongs to the Condylarthra. But Owen and Cope have shown close allies (one of which, *Pliolophus vulpiceps*, is thought by Lydekker to be identical with it) to be undoubted Perissodactyla. I refer here to the fact that Schlosser regards Hyracotherium as one of the Equine family, because the inner anterior cusp of the lower molars is double, forming the basis of the two cones, etc., in the same position in Anchitherium and the rest of the horse line. I wish to repeat here what I have already stated,[1] that this character *does not exist* in the American species, and is probably wanting in the *H. leporinum.*[2] It exists in some of the American species of Pliolophus, but I do not regard it as a constant character[3] in these animals. Both Kowalevsky and Pavlow think the *H. siderolíticum*, in which this character is present, should be placed in a genus distinct from the type *H. leporinum.* It is extremely different from that species in the well-developed anterior V of the inferior molars, as well as in the double anterior inner cusp. But in the American species there is every transition between the rudimental hook of the *H. craspedotum* to a V almost as well developed as in the *H. sideroliticum.* For these and other reasons I have regarded the Hyracotheriidæ as a variable family, and as the ancestors of *all* the Perissodactyla, of both the equine and tapiroid lines and others. Hence M. Schlosser may perceive the reason why I derive Lambdotherium from Hyracotherium.[4] (7) The existence of Condylarthra in Europe is to be expected. The order may have been of wide distribution in the Northern and possibly in the Southern Hemisphere, but we have as yet no evidence of its existence out of North America.—*E. D. Cope.*

---

[1] Cope, Amer. Nat., 1884, 347; Origin of the Fittest, 1886, p. 343. I take occasion to remark that the omission of the Marsupialia from the direct line of phylogeny of the Condylarthra, which is justly commented on by M. Pavlow, is a pure inadvertence, as may be inferred from the text (p. 351). The error is corrected at the second reference.

Geological News.—GENERAL.—Dr. J. Walther (*Jenaische Zeitschrift*, 1887) publishes, as the result of his investigations upon the structure of the flexures on the borders of continents, the following conclusions: "The continents are generally surrounded by flexures, and the course of the so-called hundred-fathom line corresponds to the descending limb of the anticlinal backbone. The region within the hundred-fathom line is composed of the edges of the beds and the rocks lying on them, and does not belong to the ocean-basins, but to the continent." The varying width of the region within the hundred-fathom line depends upon the nature of the coast and the action of the currents; thus, when a current meets a peninsula the lee side gets more transported material than the side towards which the current is turned, but under other conditions this is reversed. Barrier-reefs, says our authority, always stand upon a continental border composed of rock-fragments, and the want of such a border upon the west coast of tropical America explains the absence of a barrier-reef. Coast-volcanoes mark regions of subsidence; in such regions there is a synclinal arrangement of the materials thrown up, and coast-volcanoes outside of the hundred-fathom line stand on the synclinal.

---

[1] Naturalist, 1886, August, p. 720.

[2] Kowalevsky, Palæontographica, 1873 (Anthracotherium), pl. viii., f. 5-7.

[3] *Pliolophus vintanus,—e.g.*, Expl. S. W. 100th Mer., xlv. f. 12.

[4] Morphologisches Jahrbuch, 1886-87, p. 576.

CAMBRIAN.—Dr. G. Bornemann has recently described the fossils of the Cambrian of Sardinia. Many of the forms are closely similar to those recorded by Billings from the calciferous rocks of the Mingan Islands and other localities bordering on the St. Lawrence. *Archæocyathus* Bill. is very abundant. This fossil has also lately been discovered in the Durness limestones of Scotland.

PERMIAN.—Professor Credner has recently published the results of his studies of the life-history of a Labyrinthodont, or Stegocephalian, from the "Rothliegendes" of Saxony. The species studied was that described by Credner as *Branchiosaurus amblystomus*, and by Gaudry as *Protriton petrolei*. As no less than seventy-six examples were studied, a good idea of the life-course of the creature was obtained, and it was found that in its early stages it was aquatic, breathing by gills supported by four pairs of branchial arches. By the time Protriton reached a length of 60 to 70 mm. it cast its branchiæ and became an air-breather, its development being somewhat analogous to that of the Salamandridæ of the present day. The adults measure from 100 to 130 mm. in length. During the metamorphosis many changes occur in the skeleton, the skull becomes narrower, the interclavicle increases greatly, and the pelvis shifts backwards so that six of the caudal vertebræ become lumbar.

Professor Fritsch, of Prague, has discovered a species of theromorphous reptile of the genus Naosaurus in the Permian beds of Bohemia. This genus has been found hitherto only in Texas, and was described in this journal, 1886.

TRIAS.—Professor Cope has presented to the American Philosophical Society a description and figure of the cast of the braincase of *Belodon buceros*. Although there is no parietal foramen of the skull, the epiphysis is so enormous as to lead to the belief that the pineal eye was present. It had communication with the orbit by a canal on each side, which Professor Cope calls the *orbitopineal* canal.

TERTIARY.—Lydekker recently described *Scelidotherium chilense*, from Tarapaca, Chili. It is characterized by extremely short nasals. He also described as new *S. bravardi*, from the Argentine Republic, a form which had previously been included by Owen with the typical *S. leptocephalum*.

POSTPLIOCENE.—The discovery at Spy, in the Belgian province of Namur, of remains of two human individuals allied to those before found at Canstadt and Neanderthal, has proved that this type of man is that of a race which lived in the age of the mammoth, the bones of which, along with those of the rhinoceros, hyæna, cave-lion and cave-bear, etc., were also found in the Spy cavern. The two skulls serve as a sort of link between the Neanderthal skull and others of the same type, which can thus be traced from Stængenes, in Scandinavia, to Olmo, in Italy. The men of Spy are described by M. Fraipont, who has made an exhaustive study of the remains, as a short, but thick-set, robust folk, walking knees foremost and bandy-legged, like the modern Lapps. The broad shoulders carried a long, narrow, and depressed head, with very prominent superciliary arches, high cheek-bones, enormous orbits, retreating brow, and receding chin,—a combination of characters not to be found in any living race, and in many points showing apian affinities.

MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—In the August number of the *Geological Magazine* Mr. J. J. H. Teall[2] describes an interesting suite of hornblende rocks which occur as intrusive sheets and bosses in the limestones and quartzites of the Assynt district in Scotland. From the description which the author gives of them, these rocks appear to be somewhat similar to the camptonite of Dr. Hawes.[3] Three types are distinguished,—viz., hornblende porphyrites, diorites, and porphyrite diorites. In the last two classes hornblende is abundant in well-formed porphyritic crystals, bounded by the planes $_\infty P$, $_\infty P\grave{\infty}$, $-P$ and $0P$. Some of the larger of these crystals are so perfectly developed that when separated from the surrounding rock-mass their angles can be measured with a contact goniometer. Most of them are twinned according to the ordinary law, and many present fine instances of zonal

---

[1] Edited by Dr. W. S. BAYLEY, Madison, Wisconsin.

[2] Geol. Magazine, August, 1886, p. 346.

[3] Lithology of New Hampshire, p. 160, *et seq.;* Rosenbusch's Massige Gesteine, 1886, p. 333.